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Roland Lee Smith

Title of the Invention

Trailer Hitch Alignment System

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United States Nonprovisional Patent Application of

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SPECIFICATION

TITLE OF THE INVENTION

Trailer Hitch Alignment System

BACKGROUND OF THE INVENTION

Technical Field:

The present invention relates to a system for aligning a hitch ball of a trailer hitch that is attached to a towing vehicle with a corresponding socket on a trailer to be towed by the vehicle.

Background Information:

Connecting a towing vehicle to a trailer can be a difficult, tedious, time-consuming, and aggravating task. In order to connect a towing vehicle to a trailer, the driver of the towing vehicle must back the towing vehicle towards the trailer until the hitch ball is directly below the socket. However, the driver cannot see either the hitch ball or the socket while attempting to align them. Therefore, unless the driver has a passenger who can exit

the vehicle and verbally guide him or her, the driver must use trial and error. The driver backs the towing vehicle a bit toward the trailer, exits the towing vehicle to observe the alignment of the hitch ball and the socket, and then backs the towing vehicle up again, hoping for a better position. The driver may have to repeat this process several times before the hitch ball and socket are properly aligned. The driver may even have to restart the process several times, depending on luck and how experienced a driver he or she is. Thus, there is a need for a system to assist a driver in aligning a hitch ball of a vehicle with a socket of a trailer, so that the driver need not leave the towing vehicle or rely on another person for guidance.

Many systems for aligning trailer hitches exist. Some include mechanisms that guide the hitch ball underneath the socket once the hitch ball is partially aligned with the socket. Other systems include poles vertically extending from both the hitch ball and the socket that are visible to the driver of the towing vehicle. Different types of mirrors exist that are attachable to the rear of a towing vehicle, so that the driver ostensibly can view the hitch ball and socket in the rear view mirror. More complicated trailer hitch alignment systems employ sensors, light beams, and sound generators. The trailer hitch alignment system according to the present invention includes a guide that is removably attachable to the rear view mirror of the towing vehicle, a guide that is removably attachable to the rear window of the towing vehicle, and a vertically oriented rod extending upward from the top of the hitch socket.

BRIEF SUMMARY OF THE INVENTION

The present invention is a trailer hitch alignment system for aligning a hitch ball of a towing vehicle with a corresponding socket of a trailer to be towed by the vehicle. The present trailer hitch alignment system includes:

(a) a trailer vertical rod assembly mountable on the trailer, which includes a rod that extends in a vertical direction;

(b) a stop mountable on the trailer hitch;

(c) a rear view mirror line tab attachable to a rear view mirror of the towing vehicle; and

(d) a rear line tab attachable to a rear window of the towing vehicle, or to an inside of a tailgate where the towing vehicle is a truck. Alternatively, a trunk vertical rod assembly that is attachable to a trunk lid of the towing vehicle may be utilized instead of a rear line tab. The trunk rod assembly is preferably removably attachable to a centerline of the trunk lid by means of a magnet in the trunk rod assembly.

The trailer vertical rod assembly preferably includes:

(a) a hollow receiver sleeve with an aperture at an upper end;

(b) a rod removably insertable through the receiver sleeve aperture into the hollow of the receiver sleeve; and

(c) a detachable pin for securing the rod within the receiver sleeve. The rod stands vertically in the receiver sleeve so that it is visible to a driver of the towing vehicle.

When the present trailer hitch alignment system is in use, the driver backs the towing vehicle toward a trailer while aligning: (1) the rear mirror line tab; (2) the rear line tab in the rear window or on the tailgate, or the trunk vertical rod assembly; and (3) the rod. This aligns the hitch ball so that it ends up under the socket. Then when the stop contacts a flange on the trailer hitch socket, the trailer hitch ball and trailer socket are also vertically aligned and ready for connection. The rear mirror line tab may be on the mirror portion of the rear view mirror, or on the mirror adjustment lever below the rear view mirror. The present alignment system may also comprise a receiver sleeve attachment assembly having an inverted U-shaped or L-shaped brace and an attachment arm for mounting the receiver sleeve above the center of the trailer socket.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

A more complete understanding of the invention and its advantages will be apparent from the following detailed description taken in conjunction with the accompanying drawings, wherein examples of the invention are shown, and wherein:

FIG. **1** shows a side elevational view of a trailer vertical rod assembly and a stop of a trailer hitch alignment system according to the present invention;

FIG. **2** is a side elevational view of a trailer hitch alignment system according to the present invention, shown in use;

FIG. **3** is a top plan view of a trailer hitch alignment system according to the present invention, shown in use;

FIG. **4A** is a front elevational view of a stop of a trailer hitch alignment system according to the present invention;

FIG. **4B** is a side elevational view of a stop of a trailer hitch alignment system shown in FIG. **4A**;

FIG. **5A** is a front elevational view of an alternate embodiment of a stop of a trailer hitch alignment system according to the present invention;

FIG. **5B** is a side elevational view of an alternate embodiment of a stop of a trailer hitch alignment system shown in FIG. **5A**;

FIG. **6** is a front elevational view of a rear mirror line tab of a trailer hitch alignment system according to the present invention, shown attached to a vehicle's rear view mirror;

FIG. **7** is a front elevational view of a rear line tab of a trailer hitch alignment system according to the present invention, shown attached to a vehicle's rear window;

FIG. **8** is an exploded perspective view of a receiver sleeve attachment assembly according to the present invention;

FIG. **9** shows a side elevational view of a trailer vertical rod assembly and a stop of a trailer hitch alignment system according to the present invention;

FIG. **10** is a perspective view of a tailgate line tab of a trailer hitch alignment system according to the present invention, shown attached to a vehicle's tailgate; and

FIG. **11** is a side elevational view of a trunk vertical rod assembly of a trailer hitch alignment system according to the present invention, shown attached to a vehicle's truck lid.

DETAILED DESCRIPTION OF THE INVENTION

In the following description, like reference characters designate like or corresponding parts throughout the several views. Also, in the following description, it is to be understood that such terms as "front," "rear," "within," and the like are words of convenience and are not to be construed as limiting terms. Referring in more detail to the drawings, the invention will now be described.

Turning first to FIGS. **1** and **2**, a trailer hitch alignment system according to the present invention, generally referred to herein as **10**, comprises a stop **13** mountable on a trailer hitch **19** on a vehicle **25**, and a trailer vertical rod assembly **12** mountable on a corresponding socket **14** on a tongue **15** of a trailer **29** to be towed by the vehicle **25**. In

the preferred embodiment depicted in FIG. **1**, the trailer vertical rod assembly **12** comprises a receiver sleeve **11** and a removable rod **12A** mountable in the receiver sleeve. The receiver sleeve **11** is mountable on a top side of a downwardly facing trailer hitch socket **14**. The receiver sleeve **11**, which is preferably cylindrical in shape, is centered on the top side of the socket **14,** so that the receiver sleeve extends upward in a vertical direction. The receiver sleeve **11** is made of a rigid material such as metal or plastic. It may be welded, bolted, or riveted to the trailer socket **14**. Alternatively, a permanent magnet removably attaches the receiver sleeve **11** to the trailer socket **14**. The receiver sleeve **11** is hollow with a generally circular aperture at its top end **16** for accommodating the rod **12A**. When the rod **12A** is in the receiver sleeve **11**, a bottom end of the rod preferably contacts a bottom end **17** of the receiver sleeve **11**.

The rod **12A** of the trailer vertical rod assembly **12** is removably insertable in the aperture of the receiver sleeve **11** such that it extends vertically upward from the receiver sleeve **11**, as shown in FIG. **1.** The rod **12A** is preferably slender, solid, somewhat flexible, and generally cylindrical in shape, and has a diameter approximately equal to the diameter of the aperture in the receiver sleeve **11**. The rod **12A** is of sufficient length for its upper end to be seen from the rear view mirror **24** of the towing vehicle **25** (see FIG. **2**). There is preferably only one rod in the alignment system **10**, as only one is necessary.

As illustrated in FIG. **1**, the trailer vertical rod assembly preferably further comprises a detachable pin **22,** which further secures the rod **12A** within the receiver sleeve **11**. To remove the rod **12A** when the alignment system **10** is not in use, the pin **22** , which is preferably generally U-shaped, is removed and the rod is removed and stored until the next use. This is advantageous because the rod **12A** is less likely to be broken if it is in storage when the alignment system is not in use.

Also depicted in FIG. **1** is a trailer latching clip **63** for holding the trailer hitch ball **18** in the socket once the coupling process described herein is completed. The trailer usually comes with a latching clip **63** on top of and just in front of the trailer socket **14**.

Continuing with FIGS. **1** and **2**, the stop **13** is mounted directly behind the hitch ball **18** (i.e., between the towing vehicle and the hitch ball **18**) on an upper side of the ball mount **19A** of the trailer hitch **19.** The trailer hitch **19** is attached to the rear of the towing vehicle **25**. The stop **13** may alternatively be permanently mounted on the trailer hitch **19**. The stop **13** is preferably mounted on the curved ball mount portion **19A** of the trailer hitch **19**, as shown in FIG. **1**. This placement of the stop is advantageous in that it permits an angled approach to the trailer. Even if the towing vehicle is angled with respect to the trailer, the trailer socket will nevertheless strike the stop when it is mounted on the trailer hitch. If a stop were to instead be mounted on the trailer behind the socket, and the towing vehicle were to approach the trailer at an angle, the hitch ball would likely miss the stop. Thus, the coupling process (of the towing vehicle to the trailer) would not go as smoothly as it does when the present invention is utilized.

In the preferred embodiment depicted in FIG. **1**, the stop **13** comprises a stop brace **20** and a generally planar stop plate **21**. The stop brace **20** is generally triangular in shape, when viewed from the side, while the stop plate **21** braced by the brace is generally rectangular in shape. The height of the stop plate **21** is preferably greater than the height of the hitch ball. A longitudinal axis of the stop plate **21** is approximately perpendicular to a longitudinal axis of the towing vehicle **25**, so the stop plate is generally parallel to a bumper **57** of the towing vehicle. The longitudinal axis of the towing vehicle **25** is at **53** in FIG. **3**. A rear side **49** of the stop plate **21** faces the trailer hitch ball **18**, which is behind the vehicle.

As shown in FIGS. **4A** and **4B**, the stop brace **20** is attached to a front side **50** of the stop plate **21**, which is opposite the rear side **49** of the stop plate **21**. A longitudinal axis of the stop brace **20** is preferably perpendicular to a longitudinal axis of the stop plate **21**. The lower ends of the stop plate **21** and the stop brace **20** are mounted on the trailer hitch **19**, as illustrated in FIG. **1**, so they extend upward in a generally vertical direction.

An upper portion of the stop **13** extends vertically above the level of the trailer hitch ball **18**, as shown in FIG. **1**. The stop plate **21** is taller than the trailer hitch ball **18**,

so that the stop **13** contacts the flange **32** on the trailer socket **14** when the hitch ball **18** is aligned with the trailer socket **14** (see FIG. **1**). The slight jar alerts the driver, who is waiting for the contact, to stop the towing vehicle.

FIGS. **5A** and **5B** show an alternate embodiment of a stop plate **13A**, where an end of the stop brace **20A**, but not the stop plate **21A**, is mountable on the trailer hitch **19**. In FIGS. **5A** and **5B**, the generally rectangular-shaped stop plate **21A** is mounted on the generally rectangular-shaped stop brace **20A**. The stop plate **21A** preferably has a width that approximately matches the distance from the top of the hitch ball **18** to the top of the trailer socket **14**, so that the stop plate strikes the trailer socket flange **32** once the towing vehicle has been backed up a sufficient distance for the hitch ball to be in position under the trailer socket. This contact signals the driver to stop the vehicle immediately.

Alternate means of attaching the stop **13** to the trailer hitch **19** are suitable for use herein. In one embodiment, the stop **13** is bolted to the trailer hitch **19**. In an alternate embodiment, a permanent magnet attaches the stop **13** to the trailer hitch **19**. Alternatively, the stop **13** is permanently attached to the trailer hitch **19**. The stop **13** may be riveted, bolted, or welded to the trailer hitch **19**.

As shown in FIGS. **2, 6,** and **7**, the trailer hitch alignment system **10** further comprises at least two tabs, preferably a planar rear view mirror line tab **23** and a planar rear line tab **26**. The tabs **23, 26** are preferably made of a thin plastic material that removably adheres to mirror and car window glass. The rear view mirror line tab **23** is removably attachable to the rear view mirror **24** of the towing vehicle **25,** and the rear line tab **26** is removably attachable to a rear window **27** of the towing vehicle **25**. The rear line tab **26** is attached to either the inside or the outside of the rear window **27**. In use, the rear view mirror line tab **23** and the rear line tab **26** are attached to the center of the rear view mirror **24** and the rear window **27**, so that the rear view mirror line tab **23** and the rear line tab **26** are horizontally aligned with the trailer hitch ball **18**, which is centered in the rear of the vehicle. Additionally, the rear view mirror line tab **23** is vertically oriented on the

center of the rear view mirror **24** and the rear line tab **26** is vertically oriented on the center of the vehicle's rear window **27**, as shown in FIGS. **6** and **7**.

Both the rear view mirror line tab **23** and the rear line tab **26** comprise an adhesive on their bottom faces, so that the line tabs **23**, **26** can be removably attached to the rear view mirror **24** and the rear window **27**, respectively. In an alternate embodiment, a suction cup is attached to the bottom face of the rear view mirror line tab **23** for removably attaching the rear mirror line tab **23** to the rear view mirror **24**. In another alternate embodiment, first and second suction cups **64A**, **64B** at opposite ends of the rear line tab **26** allow removable attachment of the rear line tab **26** to the rear window **27**, as shown in FIG. **7**, or to a front face of a tailgate where the towing vehicle is a pick-up truck. In still another alternate embodiment, the rear view mirror line tab **23** removably snaps onto the rear view mirror light deflection lever **65**.

Referring to FIGS. **6** and **7**, in yet another embodiment, the rear mirror line tab **23** is incorporated into (e.g., printed on) a first sheet of transparent plastic **54** or the like, which is preferably the size of and insertable in and attachable to the rear view mirror portion **24** within the rear view mirror frame **55** (see FIG. **6**). Alternatively, a rear mirror line tab **23** may be placed on the rear view mirror light deflection lever **65** directly below the rear view mirror portion **24** (see FIG. **6**). As shown in FIG. **7**, the rear window line tab **26** is incorporated into (e.g., printed on) a second sheet of transparent plastic **56**, most preferably an 8 1/2 by 11 inch sheet. The second transparent sheet **56** is insertable in and removably attachable to the vehicle's rear window **27**. The first and second transparent sheets **54**, **56** are removably attachable to the rear view mirror **24** and the rear window **27** by virtue of static electricity. Alternatively, the bottom faces of the first and second transparent sheets **54**, **56** are coated with adhesive, so that the transparent sheets **54**, **56** removably adhere to the rear view mirror **24** and the rear window **27**, respectively. In another alternative embodiment, suction cups **64** attached to the bottom face of the second transparent sheet **56** removably secure the second transparent sheet **56** to the rear window **27**. Preferably, the line tabs **23**, **26** are brightly colored (e.g., fluorescent), so that they are

clearly visible to a driver **28** of the towing vehicle **25**. Most preferably, the line tabs **23, 26** are reflective so that they are clearly visible to the driver **28** of the towing vehicle **25** at night.

Prior to using the alignment system **10**, the receiver sleeve **11** must be attached to the socket **14** on the tongue **15** of the trailer **29**, the rod **12A** must be secured within the receiver sleeve **11**, and the level of the trailer socket **14** must be above the level of the trailer hitch ball **18** (see FIG. **1**). If the trailer hitch ball **18** is not lower than the trailer socket **14**, the driver **28** can use a jack **31** to elevate the trailer **29** to an appropriate level.

Once the alignment system **10** is in place on the towing vehicle and the trailer, the driver **28** backs the towing vehicle **25** toward the trailer **29** while assuring that the rear view mirror line tab **23**, the rear line tab **26**, and the rod **12A** are aligned (i.e., on top of one another). The driver's line of sight is indicated by the dashed lines in FIG. **2**. If one of the three moves out of alignment, the driver **28** slows the vehicle **25** and steers it into a position where the three are again aligned. When the rear mirror line tab **23**, rear window line tab **26**, and rod **12A** are aligned, the trailer hitch ball **18** and the trailer socket **14** are horizontally aligned. The driver **28** continues slowly backing the towing vehicle **25** toward the trailer **29** until the stop **13** contacts a flange **32** on the socket **14,** which indicates that the trailer hitch ball **18** and the trailer socket **14** are vertically aligned. The driver **28** quickly stops the vehicle **25**, exits the vehicle, and lowers the trailer socket **14** onto the trailer hitch ball **18**, normally using a jack **31**, as shown in FIG. **2**. Once the connection is complete, the trailer **29** can be towed to the desired location.

With the present alignment system **10**, the trailer socket **14** may be approached from an odd angle, as shown in FIG. **3**. Even though the vehicle **25** depicted in FIG. **3** is approaching the trailer **29** at approximately a 135 degree angle with respect to the trailer, horizontal alignment of the rear mirror line tab **23**, the rear window line tab **26**, and the rod **12A** results in the horizontal alignment of the hitch ball **18** and the trailer socket **14**. The driver **28** need not repeatedly exit the vehicle **25** to determine his or her progress.

receiver sleeve attachment assembly for removably mounting the receiver sleeve to the trailer socket.

Looking at FIG. **8A**, a receiver sleeve attachment assembly **30** for removably mounting the receiver sleeve **11** above the center of the top side of the socket **14** comprises a generally L-shaped section **33A** and an attachment arm **34**. The attachment arm **34** is generally rectangular in shape. The L-shaped section **33** has a horizontal portion **43** and a vertical portion **44**. As shown in FIG. **8A**, the vertical portion **44** of the L-shaped section **33** is attached to the first end **51** of the attachment arm **34,** preferably by bolts or first rivets **37** extending through the L-shaped section **33** and the attachment arm **34**. A second end **52** of the attachment arm **34** is attachable to the trailer tongue **15**.

In the preferred embodiment shown in FIG. **8A**, the attachment arm **34** comprises generally circular, spaced apart, first holes **38** in a second end **52** of the attachment arm **34** opposite to the L-shaped section **33**. The receiver sleeve attachment assembly **30** is connected to the trailer tongue **15** by bolts **39** extending through first holes **38** in the attachment arm **34** and generally circular, corresponding second holes **40** in a side of the trailer tongue **15**. Furthermore, the horizontal portion **43** of the L-shaped section **33** comprises a generally circular, threaded, horizontal portion hole **35** that is larger than the first and second holes **38, 40**. The receiver sleeve **11** has a threaded end **41**, whose threads complement the threads of the horizontal portion hole **35** in the L-shaped section, which is insertable in the horizontal portion hole for coupling with the receiver sleeve attachment assembly **30**.

Continuing with FIG. **8A**, a first, threaded nut **36** placed over the threaded section **41** abuts a top side of the horizontal portion **43** of the L-shaped section **33**. A second, threaded nut **42** placed over the threaded section **41** after the threaded end **41** is screwed into the third hole **35** abuts a bottom side of the horizontal portion **43** of the L-shaped section **33**. The nuts **36, 42** further secure the receiver sleeve **11** to the receiver sleeve attachment assembly **30**.

Alternatively, the receiver sleeve **11** is mounted directly on the center of the top side of the trailer socket **14**. In one embodiment, the receiver sleeve **11** is bolted to the socket **14**. In another embodiment, a permanent magnet removably attaches the receiver sleeve **11** to the trailer socket **14**. The receiver sleeve **11** may also be permanently mounted to the socket **14**. For example, the receiver sleeve **11** may be welded or riveted to the socket **14**.

FIG. **8A** also shows the interaction of the pin **22**, which is generally U-shaped, with the receiver sleeve **11** and the rod **12A**. The pin **22** comprises a linear pin section **47** continuous at one end with and opposite to a curved pin section **48**. The linear pin section **47** is insertable in a generally circular fourth hole **45** extending transversely through the receiver sleeve **11,** and a generally circular fifth hole **46** extending transversely through the rod **12A**. When the pin **22** is in place, the curved pin section **48** contacts the outside of the receiver sleeve **11**.

Turning to FIG. **8B**, an alternative, yoke-shaped receiver sleeve attachment assembly **80** is also for removably mounting the receiver sleeve **11** above the center of the top side of the socket **14.** This yoke-shaped attachment assembly **80** comprises a generally inverted U-shaped section **73** and matching arms **74** for attaching the section to the trailer. The matching arms **74** are shaped to fit the configuration of the trailer. Second rivets **77** attach a first, bottom end **78** and a second, bottom end **79** of the U-shaped section **73** to third ends **82** of the matching arms **74**. A substantially horizontal section **81** of the U-shaped section **73** comprises a generally circular, threaded receiver sleeve hole **75** for receiving the threaded end **41** of the receiver sleeve **11**. Bolts **39** extending through second holes **40** and generally circular, sixth holes **76** in the fourth ends **83** of the matching arms **74** connect the matching arms **74** to the trailer tongue **15**.

In an alternate embodiment shown in FIG. **9**, a trailer vertical rod assembly **12** comprises a telescoping rod **12B** comprised of three successively thinner segments, which telescope into one another. This is advantageous in that a collapsed rod is less likely to present an enticement to vandals. This telescoping rod **12B** is extendible in a vertical

direction. When the alignment system of the present invention is not in use, an uppermost rod segment **60** (with a stop at its upper end) telescopes into a middle rod segment **59**, and both of those segments **60**, **59** telescope into a lower rod segment **58**.

The lower end of the telescoping rod **12B** may be stationary and affixed to the upper surface of the trailer tongue at its center, or the lower end may comprises a pivoting mechanism **61**. In the latter case, the lower rod segment **58** is pivotable around the pivoting mechanism **61**, so that the lower rod segment can be rotated ninety degrees from its vertical in-use position to a nearly horizontal, inclined position along the upper edge of the trailer. When it is not in use, the rod **12B** is less likely to be broken when it is in an inclined position, or when it has been removed.

Continuing with FIG. **9**, another embodiment of the stop **13B** is comprised of a stop brace **20B** affixed to a front side **50** of a stop plate **21B**. The lower end of the stop brace **20B**, but not the stop plate, is affixed by a permanent magnet **62** to an upper surface of a trailer hitch **19**.

Referring to FIG. **10**, a tailgate line tab **66** may be substituted for the rear window line tab **26**. The tailgate line tab **66** is removably attachable to an inside, front face **67** of a towing vehicle's tailgate **68**, where the towing vehicle has a tailgate (e.g., a pickup truck). The bottom face of the tailgate line tab **66** is preferably coated with an adhesive so that the tailgate line tab **66** removably adheres to the inside face of the tailgate **68**. Alternatively, at least one permanent magnet affixed to a bottom face of the tailgate line tab **66** removably adheres the tailgate line tab **66** to the tailgate **68**.

To use a trailer hitch alignment system according to the present invention including the rear view mirror line tab **23** depicted in FIG. **6**, the tailgate line tab **66** of FIG. **10**, and the stop **13** and trailer vertical rod assembly **12** shown in FIG. **9** (or FIG. **1**), the alignment system is first set up on the towing vehicle and the trailer. The driver **28** then backs the towing vehicle **25** toward the trailer **29** while assuring that the rear view mirror line tab **23**, the tailgate line tab **66**, and the rod **12A** of the trailer vertical rod assembly **12** are aligned. Once the towing vehicle has been backed up a sufficient distance for the hitch ball **18** to be

in position under the trailer socket **14**, the stop plate **21** strikes the trailer socket flange **32**. This contact signals the driver to stop the towing vehicle immediately. The hitch ball **18** is now aligned under the trailer socket **14**. The driver puts the towing vehicle in "Park", and exits the vehicle. The driver then lowers the trailer socket **14** onto the hitch ball **18** and engages the trailer latching clip **63** (see FIG. **1**), as usual.

As depicted in FIG. **11**, an alternate embodiment of an alignment system according to the present invention includes a trunk vertical rod assembly **69** in place of a rear line tab **26** in a rear window **27** of the towing vehicle, or a tailgate line tab **66** on the towing vehicle's tailgate. The trunk vertical rod assembly **69** comprises a second rod **70**, which is attached at one end to, and extends vertically from, a center of a generally horizontal, circular base **71**. The length of the second rod is most preferably approximately equal to the height of the rear window. The trunk vertical rod assembly **69** is removably attachable to the top of a vehicle's trunk lid **72**, where the towing vehicle **25** has a trunk lid **72**. Preferably, at least one permanent magnet affixed to a bottom face of the base **71** allows the trunk vertical rod assembly **69** to be removably adhered to the trunk lid **72**. The user preferably makes a mark at the outset with a permanent marker at the center of the trunk lid to assist in rapid placement of the trunk vertical rod assembly **69** during subsequent uses of the trailer hitch alignment system. Alternatively, the bottom face of the base **71** may be coated with an adhesive, so that the trunk vertical rod assembly **69** adheres to the trunk lid **72**.

To use a trailer hitch alignment system according to the present invention including the rear view mirror line tab **23** depicted in FIG. **6**, the trunk vertical rod assembly **69** in FIG. **11**, and the stop **13** and trailer vertical rod assembly **12** shown in FIG. **9** (or FIG. **1**), the alignment system is first set up on the towing vehicle and the trailer. The driver **28** then backs the towing vehicle **25** toward the trailer **29** while assuring that the rear view mirror line tab **23**, the second rod **70** of the trunk vertical rod assembly **69**, and the rod **12A** of the trailer vertical rod assembly **12** are aligned. Once the towing vehicle has been backed up a sufficient distance for the hitch ball **18** to be in position under the trailer socket

14, the stop plate **21** strikes the trailer socket flange **32**. This contact signals the driver to stop the towing vehicle immediately. The hitch ball **18** is now aligned under the trailer socket **14**. The driver puts the towing vehicle in "Park", and exits the vehicle. The driver then lowers the trailer socket **14** onto the hitch ball **18** and engages the trailer latching clip **63** (see FIG. **1**), as usual.

Also included herein is a kit for aligning a trailer hitch **19** of a towing vehicle **25** with a corresponding socket **14** on a trailer. The kit comprises:

(a) a trailer vertical rod assembly **12** mountable on the trailer, the trailer vertical rod assembly **12** comprising a vertically extendible rod **12A**;

(b) a stop **13** mountable on the trailer hitch **19**;

(c) a rear view mirror line tab **23** attachable to a rear view mirror **24** of the towing vehicle **25**; and

(d) a rear line tab **26** or **66** attachable to a rear window **27** or a tailgate **68,** respectively, of the towing vehicle. The kit preferably further comprises a trunk vertical rod assembly **69** attachable to a trunk lid **72** of the towing vehicle **25** instead of, or in addition to, the rear line tab **26**, **66**.

From the foregoing it can be realized that the described system of the present invention may be easily and conveniently utilized as a trailer hitch alignment system. It is to be understood that any dimensions given herein are illustrative, and are not meant to be limiting.

While preferred embodiments of the invention have been described using specific terms, this description is for illustrative purposes only. It will be apparent to those of ordinary skill in the art that various modifications, substitutions, omissions, and changes may be made without departing from the spirit or scope of the invention, and that such are intended to be within the scope of the present invention as defined by the following claims. It is intended that the doctrine of equivalents be relied upon to determine the fair scope of these claims in connection with any other person's product which fall outside the literal wording of these claims, but which in reality do not materially depart from this invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.